

Claims

1. Gas spring damper unit for a motor vehicle comprising a cylinder casing (1) and a cylinder piston (4) shiftable in the cylinder casing (1) and having a piston rod (5), wherein the cylinder piston (4) is sealed relative to the cylinder casing (4) by a sealing element (12) and wherein the piston rod (5) is connected to the cylinder casing (1) by rolling bellows (8), where by a spring damper chamber (13) becoming smaller upon spring compression and a damper chamber (14) becoming larger upon spring compression are formed, wherein the two chambers are connected by a throttle acting in two directions and disposed in the cylinder piston (1) and wherein this throttle comprises one or several overflow throttles (15), characterized in that

- the overflow throttles (15) have in each case a flow resistance different relative to the flow through direction, and
- the flow resistance of each of the overflow throttles (15) is dimensioned such in at least one of the passing through directions that the critical Reynolds number for the transition from the laminar into the turbulent kind of flow is disposed within the pressure difference over the overflow throttle (15), wherein the pressure difference is predeterminable from the possible piston speeds.

2. Gas spring damper unit according to claim 1, characterized in that the functional effective center of gravity of all flow through resistances of the flow through throttle (15) is disposed at a point outside of the radial center axis of the cylinder piston (4) and on the same side of the cylinder piston (4).

3. Gas spring damper unit according to claim 2 characterized in that the functional effective center of gravity of all flow resistances of the overflow throttles (15) is disposed on the side of the spring damper chamber (13) decreasing in size.

4. Gas spring damper unit according to claim 3 characterized in that the flow resistance of each over flow throttle (15) is determined by the length of the throttle, the cross-section of the throttle, the shape of the throttle and/or the wall properties of the throttle.

5. Gas spring damper unit for a motor vehicle comprising a cylinder casing (1) and a cylinder piston (4) shiftable in the cylinder casing (1) and having a piston rod (5), wherein the cylinder piston (4) is sealed relative to the cylinder casing (4) by a sealing element (12) and wherein the piston rod (5) is connected to the cylinder casing (1) by rolling bellows (8), where by a spring damper chamber (13) becoming smaller upon spring compression and a damper chamber (14) becoming larger upon

spring compression are formed, wherein the two chambers are connected by a throttle acting in two directions and disposed in the cylinder piston (1) and wherein this throttle comprises one or several overflow throttles (15), characterized in that

- the overflow throttles (15) have in each case a different flow resistance relative to the flow passage direction, and
- the overflow throttles (15) comprising in each case a passing through throttle bore hole with at least one cross-sectional narrowing, wherein
- the functional effective center of gravity of all flow resistances of the overflow throttle (15) is disposed at a point outside of the radial central axis of the cylinder piston (4), and
- the throttle bore hole is dimensioned such that critical Réynolds number for the transition from the laminar flow kind to the turbulent flow kind occurs within the possible piston speeds and in at least one passage flow direction.

6. Gas spring damper unit according to claim 5 characterized in that the functional effective center of gravity of all flow resistances of the flow through throttle (15) is disposed on the same side of the cylinder piston hole (4).

7. Gas spring damper unit according to claim 6 characterized in that the functional effective center of gravity of all flow resistances of the overflow throttle (15) is disposed on the side of the smaller becoming spring damper chamber (13).

8. Gas spring damper unit according to claim 7 characterized in that the flow resistance of each overflow throttle (15) is determined by the length of the throttle, the cross-section of the throttle, the shape of the throttle and/or the wall properties of the throttle.

9. A gas spring damper unit for a motor vehicle comprising
a cylinder casing (1);
a cylinder piston (4) shiftable in the cylinder casing (1) and having a piston rod (5) attached;
a sealing element (12), wherein the cylinder piston (4) is sealed relative to the cylinder casing (4) by the sealing element (12);
rolling bellows (8) connecting the piston rod (5) to the cylinder casing (1);
whereby a spring damper chamber (13) becoming smaller upon spring compression and a damper chamber (14) becoming larger upon spring compression are formed;
a general throttle connecting the spring damper chamber (13) to the damper chamber (14), wherein the general throttle acts in two directions and is disposed in the

cylinder piston (1) and wherein the general throttle includes an overflow throttle (15) having a difference of flow resistance such that the flow resistance in a higher flow resistance direction is at least about 5 percent higher as the flow resistance in a lower flow resistance direction.

10. The gas spring damper unit according to claim 9 wherein the overflow throttle (15) is formed by a bore hole, has a flow resistance relative to the flow passage direction such that the gas weight throughput in the direction of less flow resistance of the bore hole can be from about 1.2 to 20 times the gas weight throughput in the direction of higher flow resistance

11. The gas spring damper unit according to claim 9 wherein the diameter of a bore hole of the overflow throttle (15) is disposed from a first opening of the bore hole to an second opening of the bore hole within a ratio of from 1 to 10 up to a ratio of 1 to 1.2

12. The gas spring damper unit according to claim 11 wherein

-the functional effective center of gravity of all flow resistances of the overflow throttle (15) is disposed at a point outside of a radial central axis of the cylinder piston (4).

13. The gas spring damper unit according to claim 9 wherein a bore hole of the throttle (15) is dimensioned such that a transition from a laminar flow to a turbulent flow occurs within possible piston speeds and in a passage flow direction having a higher flow resistance.

14. The gas spring damper unit according to claim 9 wherein a functional effective center of gravity of all flow resistances of the over flow throttle (15) is disposed on a same side of a cylinder piston hole (4).

15. The gas spring damper unit according to claim 14 wherein the functional effective center of gravity of all flow resistances of the overflow throttle (15) is disposed on the side of the smaller becoming spring damper chamber (13).

16. The gas spring damper unit according to claim 15 wherein the flow resistance of each overflow throttle (15) is determined by the length of the throttle, the cross-

section of the throttle, the shape of the throttle and/or the wall properties of the throttle.

17. The gas spring damper unit according to claim 9 wherein a bore hole of the overflow throttle (15) has a conical section and wherein a cone face of the conical section is disposed at a cone angle from about 10 to about 70 degrees relative to a longitudinal axis of the bore hole of the throttle (15).